Space M&S Focus Area Collaborative Team

Improving Space Representation in Simulation

The Army Space Modeling and Simulation (M&S) Focus Area Collaborative Team (FACT) was formed to address the deficiency of space representation in Army M&S. The Army acknowledged the shortfalls of Space M&S during the Sept. 4, 2001, Space Force Management Analysis (FORMAL) Review and the Vice Chief of Staff of the Army agreed for Headquarters, Department of the Army (HQDA), to direct the preparation of a "roadmap or action plan" for space representation in Army M&S. This mission was assigned to the Army Space and Missile Defense Command (SMDC), with assistance from the Training and Doctrine Command (TRADOC), the Army Materiel Command (AMC), and the Army Model and Simulation Office (AMSO). The Space FACT, led by SMDC, is an Army-wide multi-disciplinary team comprised of community experts organized to research, identify, and coordinate simulation technology projects in Space M&S.

Space representation in simulations is critical because of the current and increasing role of space in Army and Joint operations. Space enables the Objective Force (OF) to "see first, understand first, act first, and finish decisively" by providing essential situational awareness and communications. In addition, space facilitates information superiority by connecting soldiers and units to the Global Information Grid (GIG) of knowledge and services. While the GIG hosts the wealth of data and information critical to the Common Operating Picture (COP), space makes possible a COP shared among widely separated Unit of Actions (UAs) and the critically supportive Home Station Operations Center (HSOC). GPS satellites permit accurate location determinations to facilitate precision Blue Force Tracking (BFT) as well as accurate sensor and weapon system emplacement and coverage determinations within the COP.

Space-based sensors provide the preponderance of intelligence data prior to entry operations and critically augment Unit of Engagement (UE) and UA surveillance and reconnaissance systems for all operations leading to and following decisive operations. Assured access to space and National Technical Means (NTM) systems enables the OF to directly employ few if any high endurance intelligence, surveillance, and reconnaissance (ISR) systems and to forego the expense in dollars, lives placed in harm's way, and political capital associated with cutting-edge spy systems. Space also fosters international and interagency interoperability to place knowledge and other resources at the Land Component Commander's (LCC) disposal that could not historically be without endangering non-combatant Americans, soldiers, and diplomats from coalition partners.

While the Army already employs many real-world space capabilities, Army simulations lack space representations for analysis or training of these basic functions. Shortfalls in the scope, accuracy, consistency, and availability of space representations pervade all of the Army M&S domains. Army investment in space system simulation to examine basic OF concepts and new concepts like self-configuring, self-healing communications networks involving satellites and satellite surrogates, Joint interdependent battle command concepts, and even distributed effects planning is of paramount importance.

The Army Space FACT determined the space voids in simulation by surveying the Army in three areas of interest: Operational Needs, M&S Needs, and M&S Capabilities. The surveys revealed that the top five Space M&S functional needs are: ISR, Space Communications, Tactical/Theater Ballistic Missile (TBM)/Weapons of Mass Destruction (WMD) Early Warning, Global Positioning, and Blue Force Tracking. The space FACT sought those space missions or functions that appear to lend themselves to a common simulation implementation across multiple domains and/or between various levels of granularity in the traditional hierarchy of models and simulations. A roadmap was developed to form the needs and priorities involved a careful decomposition of the explicit needs identified.

The Space FACT identified relevant space M&S activities associated with current force training, OF or Future Combat Systems (FCS) experimentation, or the introduction of new space systems into DoD. In addition, the team also determined that most of this activity produced ad hoc integrations and point solutions that were either difficult to adapt for general-purpose application or were expensive to relocate, reintegrate, and reuse. The FACT plans to use these short-term events as use cases to form the foundation for a set of general-purpose algorithms for integration into evolving models. The enabling simulation technology activities are scheduled first on the roadmap. Once developed, Army Warfare Simulaton (AWARS), One Semi Automated Force (OneSAF), and Combat XXI will be the initial integration customers for the new algorithms.

The FACT will deliver products focused on key enabling technology, equipping the OF, and training the current and interim forces. Adequate space representation in Army simulations will lead to system acquisition and doctrine development that will leverage space capabilities and functions. The Army Model and Simulation Executive Council (AMSEC) approved the Space FACT roadmap in October 2002.

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